

## Session 2

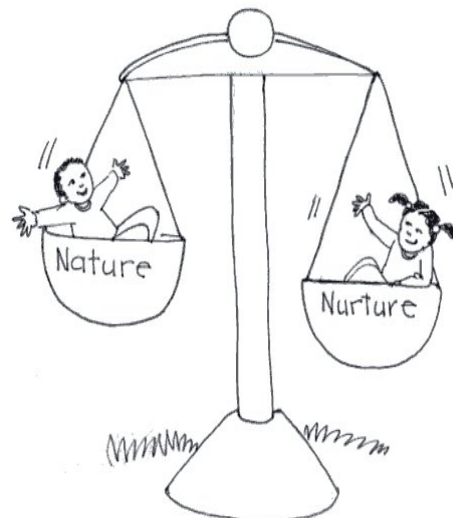
# Brain Development; Ages and Stages; Comfort and Calming



### Nature vs. Nurture

The debate of whether children are more influenced by their genetics (nature) or the way they are parented (nurture) is over. From nearly the dawn of modern civilization, anyone and everyone who felt so inclined would engage in the nature vs. nurture argument. Just in case you missed it, the argument would focus on whether children develop good or bad characters because they were born that way (nature) or because they were treated that way (nurture, or in the case of a bad character, the lack of it!). Well, after hundreds of thousands of debates over the centuries, professionals on both sides have finally reached a conclusion: we are who we are as a result of a relationship between nature and nurture. In essence, it's not a contest, but a dance.

Everyone comes into the world with a genetic makeup, or nature. It's theirs and theirs alone. Height, skin color, hair color, gender and other physical features are the obvious. Temperament, sexual preference, predisposition to alcoholism, to cancer, and to other illnesses are some of the not so obvious that are also a part of us. They're the gifts our parents give us at conception, and try as we may, there's not much you can do to not be who you are genetically determined to be. But the environment or nurture can influence these predispositions and how, or if, they'll play out.



## Children's Brain Development

Children's brains are a work in progress. How they develop is related to the experiences they have in their early years. How children's brains develop depends upon how the genes they're born with (nature) interact with the experiences they have (nurture).



### Parts of the Brain

The brain is made up of five major parts:

#### 1. Brainstem

The brainstem is fully developed at birth. The brainstem is responsible for survival functions such as blood pressure, heart rate, and body temperature. The brainstem must be fully functional at birth in order for an infant to survive.

#### 2. Cerebellum

The cerebellum controls a person's automatic movements and balance. Dancing, kicking a football, or bringing a cup to the lips to drink are all coordinated by the cerebellum. If a child's cerebellum is damaged, the brain cannot coordinate movement.

#### 3. Midbrain

The midbrain controls sleep, arousal responses, appetite and motor movements such as running and skipping. The midbrain is very important for moving.

#### 4. Limbic System

The limbic system controls emotions and long-term memories. The limbic system can override rational thoughts and parts of the brain controlled by the brainstem such as blood pressure. Stress will cause blood pressure to go up. A part of the

limbic system is involved in attaching emotions to memory. So, every time we remember an event, the emotion comes along with it.

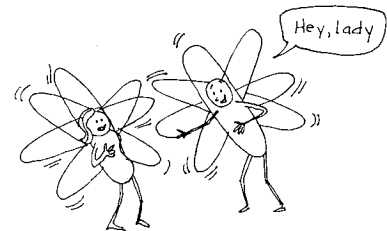
Another part of the limbic system converts information from learning and working into long-term memory. It checks new information against stored experiences in order to establish meaning.

#### 5. Cortex

The cortex is the "executive branch" of the brain. It regulates decision-making and makes judgments about incoming information. Different regions of the cortex are responsible for processing our vision, touch, hearing, speech, language development, and problem solving. It also allows us to plan and rehearse our future actions.

### How Children's Brains Develop

Each child is born with 23 billion neurons. These 23 billion neurons form trillions of synapses connections).



At birth, the connections are not very fast. But, the more the brain is stimulated, the faster and stronger these connections become. These connections then become a part of the permanent structure of the brain. But, if the brain is not stimulated, the pathways dry up.

In the past, neuroscientists assumed that by the time babies are born, the structure of their brains had been genetically determined. Today, scientists know that the brain of the baby is still forming connections responsible for feeling, learning, and remembering after birth.

At birth, the brain's 100 billion or so neurons form more than 50 trillion synapses (connections). Most of the synapses that are crucial to learning form *after* birth. Genes have already determined the brain's basic wiring, and have formed the connections in the brain stem that will make the heart beat and lungs respire.

In the first months of life, the number of synapses will increase to more than 1,000 **trillion**. It is through the development of these synapses that the brain develops a functional architecture. Without this, there would be no habits, no thoughts, no consciousness, no memories, and no mind.

Experiences from the outside world create the architecture of the brain, allowing the brain to create or modify existing connections.

### Effects of Violence and Stress on Kids' Brains

Neuroscientists are now recognizing brain damage caused by abusive experiences. Abusive experiences can increase the risk of developing behaviors ranging from:

- Aggression
- Failure
- Language deficits
- Depression
- Mental disorders
- Diabetes
- Asthma
- Epilepsy
- High blood pressure
- Immune system dysfunction



Abusive experiences organize the millions of constantly active connections between brain cells into atypical networks. Bad experiences affect the brain primarily through stress hormones such as cortisol and adrenaline. These stress hormones are designed to respond to psychological or physical danger and prepare the body for fight or flight. Normally, the transition is smooth and the brain and body go back to an even keel when the danger is over.



When these hormones are overactive as a result of persistent stresses, they can take over genetic regulation. The terrorized genes set up irregular networks of connections between brain cells. Some

examples are an epileptic seizure instead of a clear signal, a depressive episode instead of a happy thought, or a surge of rage instead of a willingness to compromise.



### What Every Child Needs

To promote children's brain development, every child needs:

**Interaction.** Consistent, long term attention from caring adults increases children's capacity to learn.

**Touch.** Holding and cuddling children help their brain grow.



**Stable Relationships.** Relationships with parents and other caregivers buffer stress that can harm your child.

**Safe, Healthy Environments.** Environments should be free of lead, loud noises, sharp objects and other dangers.

**Self-Esteem.** Self-esteem grows with respect, encouragement and positive role models from the beginning.

**Quality Care.** Quality care from trained professionals can make the difference when you can't be with your child.

**Play.** Play helps children explore their senses and discover how the world works.

**Communication.** Talking with your children helps to build verbal skills.

**Music.** Music expands children's world, teaches them new skills, and offers parents a fun way to interact with their children.

**Reading.** Reading to children helps grow a healthy brain and helps create a lifetime love of books.



## Developmental Stages

There are three things we know about typical child development:

1. All children are predisposed with certain characteristics but the brain of young children is still developing.
2. All children go through developmental stages with certain tasks and accomplishments needing to be met in order to move on to the next stage.
3. The expectations parents and other adults have for children grossly affects whether childhood will be a nurturing experience or not.

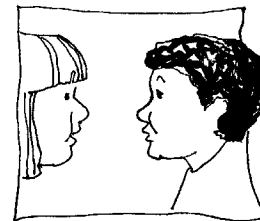
There are four primary stages of normal development all children go through.

1. **Physical Development.** Physical development means that as children get older, they usually get bigger. Usually when they get older and bigger, their gross motor and fine motor skills increase. Gross motor means activities like running, throwing, jumping, crawling, etc. Fine motor means activities like writing, holding a fork and knife, using scissors, etc. Physical development is important for helping children not only to increase their skills but also organize their behaviors.
2. **Intellectual Development.** Intellectual development means that children learn more the

older they get. They learn to recognize shapes and colors, recite the alphabet, figure out problems, and many other things. These intellectual abilities continue to increase as children grow older. But stimulation is necessary in order for these intellectual capabilities to occur. Without stimulation, these capabilities may lag behind or fail to develop.

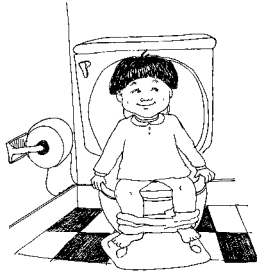


3. **Language Development.** Language development means that as children grow older, their communication skills increase. Their ability to use words, phrases, and sentences in writing and in conversation help them gain mastery of their environment by expressing their needs and understanding the needs of others. Language expands from a few simple sounds during the first year of life to the use of thousands of words in their teen years. Talking to children when they're babies and continuing good communication skills throughout childhood is an essential quality of nurturing parenting.
4. **Social and Emotional Development.** Social and emotional development go hand-in-hand. The way we treat children and the care they receive affect the way they mature, and are capable of interacting with others. *Children's emotional growth goes from an early stage of dependence and taking to a later stage of independence and giving.*



Some developmental psychologists will refer to a fifth area or stream of development. This is called adaptive development. **Adaptive development is**

how all of the areas work together to help the child function in the world. For example a three year-old child who is using the toilet independently may use his language skills to say, " I need to go to the bathroom." His physical development will determine how quickly he can walk to the bathroom, control his bladder while walking, and perhaps unsnap or unzip his pants and pull them down. His social/emotional development will help determine the child's desire to cooperate with parents in learning toileting skills.



### Impact of Special Needs and/or Health Challenges on Development

Children with special needs and/or health challenges develop in each of the areas as well: physically, intellectually, socially and emotionally. For children with health challenges, the health condition itself or the treatment associated with the health challenge will hinder or impede typical growth and development. Children may acquire skills and proceed through stages only later to regress or lose ground. As a parent of a child with a health challenge it is important to know the potential of your child and provide opportunities for that child to reach developmental milestones. Children with health challenges can accomplish many milestones and master developmental challenges when given the appropriate support.

When a child has special needs or developmental delays there may be one or more areas of development that lag behind their typically developing peers. You can encourage your child through play and activity to meet developmental milestones at their own pace. Recognizing the sequence of typical development can help you to support your child's development in all areas. Remember to focus and build on your child's strengths.

Some children have atypical development. A child with atypical development may exhibit development that is out of sequence, or not usually seen in the typically developing child. An example, may be an

autistic child who is reading at the age of three, but does not engage in communication with others, or a child that has severe and prolonged temper tantrums based on sensory adversity.

Speak with your child's health care provider or therapist to determine how to best support your child in reaching his or her greatest potential.

### Developmental Stage: Infant

The first year of an infant's life is both fascinating and startling. For years, psychologists thought that babies were incompetent creatures who were unable to comprehend the world around them. Today we know this is untrue. It is apparent that very young infants can begin to make some sense of their new environment. As children grow older during the first year of life, their body language, intelligence, and social interactions also increase.



#### Physical Development

The major part of the infant's first year is devoted to survival. The infant is completely helpless at birth and is totally dependent upon the parents for help. Being fed, held, touched, looked at, and talked to have significant impact on the growth of the child. The first year is indeed an important one for the child's physical growth.



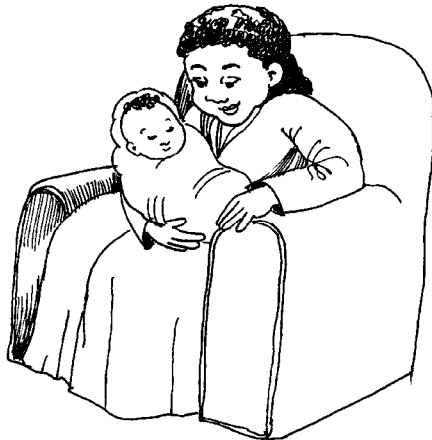
#### Intellectual Development

Physical and intellectual development are closely related to one another. The child learns about the world through exploration of objects, by moving around, and through interactions with

parents. The behavior of infants during the first year, and in subsequent years, helps them understand, adapt, and interact effectively with their world.

### Language Development

Language develops very slowly during the first year of life. At birth, babies cannot say any words. By the end of their first year, their vocabulary increases to about two to eight words. Typically developing six month-olds will laugh out loud, turn to the sound of a voice, babble, and respond to language cues of a caregiver.



An adult's vocabulary is largely determined by the speech they heard in the first three years of life. The first two years are very important. Parents who talk to their babies, and praise and reinforce their efforts at communication, help facilitate the development of language.

### Social and Emotional Development

In the earliest stage of life, birth to one year, the child struggles with learning to trust or mistrust himself and others in his environment. The child whose needs are met, whose discomforts and fears are quickly removed, who is held, loved, played with, and talked to develops a belief that the world is a safe place, and that people are dependable and helpful.

For children who do not have their needs met, the world is not a safe, fun place to be and the infant learns people cannot be depended on.

### Developmental Stage: Toddler

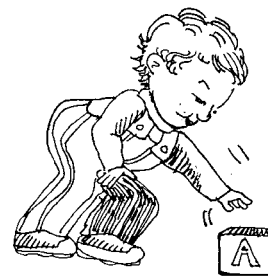
Life with toddlers is rarely dull. Their busyness, intensity, curiosity, independence, and increasing verbal skills make them both exciting and frustrating for parents. Parents are often pleased by some of the

observations toddlers verbalize, and sometimes outraged at their stubbornness. This stage has often been called the "terrible two's" because of the child's increased needs to explore their surroundings and gain control over the environment. The toddler during this stage is in a rush to discover a new style of living.



### Physical Development

Although growth in the second and third years is slower than infancy, it still occurs at a rapid pace. Toddlers are developing both Large/Gross Motor skills and Fine/Small Muscle coordination. For example: The toddler can pick up things from a standing position without falling. Now that his hands are free, he loves to carry things, especially big things. The toddler combines use of several objects: hitting one object with the other; dropping small things into large containers. (15-18 months)



### Intellectual Development

The increased exploration and discovery of objects within the environment leads to activities that expand the child's understanding of the world. Toddlers begin to understand that each object has an individual use. Such understanding

leads to exploration of these objects and how they work. Toddlers at this stage have been referred to as "little scientists."



### Language Development

Babies begin to produce a few basic words at about 1 year of life. At 18 months you may hear a toddler using "jargon" a specific type of "talking" where children use tone and inflection in stringing sounds together, but aren't necessarily using words that are recognizable by others. By 24 months, most children are speaking phrases and have a wide range of words.



A typically developing 2 year old will be able to use unique two word phrases. Indications of atypical development might be a 2 yr old who uses echolalia (repeats what they hear) but does not string together two words to communicate needs. A 2 year old generally has a vocabulary of perhaps 50 words, which increases to about 900 words by the time the child is 3 years old. Many factors contribute to the development of language in a child.

Three important factors are:

- A strong, emotional relationship with the parents.
- The amount and quality of time spent together.

- The amount of time spent talking, asking questions, and responding to what the child says. The absence or presence of developmental delays, hearing impairments, health concerns, or atypical development.

### Social/Emotional Development

Parents of toddlers have an overwhelming job. The child continues to be needy and dependent, but at the same time is growing and developing into an independent person both physically and emotionally.

Some children may turn to a "lovey" or object like a blanket or suck their thumbs for comfort. This is not a sign of dependence. It is a way for a child to comfort himself without having to rely on his parent or caregiver.

The second and third years of a child's life focus on the emergence of autonomy. This autonomy is build upon the child's new motor and mental abilities. The child takes pride in his new accomplishments and wants to do everything himself. It is important during this stage for parents to allow the child to express autonomy.

### Special Problems

Special social/emotional problems arise during this time that will briefly be discussed.

#### Separation From Parents

Children quite frequently get upset at separation from the parents. Crying at separation is normal. Throwing temper tantrums at separation is a sign of possible problems. Children feel fear that can turn into panic during actual separation.

